

# PATENT SPECIFICATION

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## DRAWINGS ATTACHED

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## (54) APPARATUS FOR DEOXIDISING METAL ARTICLES

(71) I, RAYMOND FREDERIC MOREILLON, a Swiss Citizen, of Hauptstrasse, Ermatingen, Thurgau, Switzerland, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention concerns apparatus for deoxidizing metal articles.

In many instances when metal articles oxidize under the effect of chemical influences the need arises to remove the blemishes arising from the oxidation, by suitable treatment, in order to restore the metal surface to a bright and clean appearance. This need occurs particularly in the hotel trade, where the silver or silver-plated cutlery, vessels and plates and trays of all kinds used in connection with the service of food become stained for instance when they come into contact with salad sauces, eggs, and the like.

Deoxidizing baths which comprise a trough containing hot water to which a product having a galvanizing action is admixed, are already known. Metal articles that are to be deoxidized are placed into a basket wherein is an aluminium insert, and the basket is immersed in the liquid in the trough. Contact of the metal articles with the aluminium insert on the one hand, and with the hot solution on the other hand, results in a galvanic action on or ion-exchange treatment of the metal articles, so that these articles, after immersion for only a few seconds in the hot solution, leave the trough in a bright and clean condition.

Baths of this type are generally unsuitable for use in relation to domestic or commercial catering; for example they cannot safely or conveniently be used in kitchens. There is a very substantial risk, upon immersing the basket containing the metal articles in the liquid bath, of the liquid overflowing or slopping over, especially

when a relatively large number of metal articles are being treated. Where small number of metal articles are concerned, on the other hand, this method is uneconomical. Its use is convenient only for small baths which are intended for small quantities of metal articles. This is because where fairly large baths are concerned, the basket containing the metal articles becomes very heavy and the manipulation thereof is tiring and dangerous, since the hot bath liquid containing the chemical deoxidising compound burns and attacks the skin.

The invention has as its object to provide an apparatus for deoxidising metal articles with which both small and large quantities of such metal articles can be treated economically and effortlessly, and which, moreover, is constructed in such a way that the operator does not come into contact with the bath liquid, so that the risk of injury and burning of the skin is avoided.

The apparatus of the invention for deoxidising metal articles comprises at least two containers which are disposed one above the other, are connected to one another and of which at least an upper one is equipped for reception of the metal articles to be deoxidised, whilst at least a second one serves as a reservoir for deoxidising liquid and lies below the said upper one, means being provided for conducting the deoxidising liquid from the reservoir into the container for the metal articles so as to bring the liquid to a level therein to immerse the articles, and then back to the reservoir for emptying the said container for the metal articles, characterised in that the said means for conducting the deoxidising liquid comprises a centrifugal pump which operates to pump the deoxidising liquid from the reservoir to the container for the metal articles and, when stopped, permits the liquid to flow back to the reservoir. The container which is intended for the

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reception of the metal articles and which is advantageously provided with an aluminium member, e.g. an aluminium plate, promoting the deoxidising, may be provided with one or more removable baskets by means of which the metal articles can be introduced into the container and be removed therefrom.

The invention will be described further, by way of example, with reference to the accompanying diagrammatic drawing in which the single figure illustrates a preferred embodiment of the apparatus of the invention, comprising two containers.

The illustrated embodiment of the apparatus of the invention comprises two containers disposed one above the other, namely an upper container 1 for receiving the metal articles that are to be deoxidised and a lower container 2 which is disposed below the upper container 1 and serves as a reservoir for a deoxidising liquid. Accommodated in the reservoir 2 is a heating element 3, preferably an electric heating element, which is controlled by a switch 6, enabling the deoxidising liquid in the reservoir 2 to be heated to an adjustable predetermined temperature set by means of a thermostat (not shown).

Provided in the container 1 are one or more baskets 4 into which the articles to be deoxidised can be laid or placed. These baskets 4 can be lowered from above into the container 1. In the exemplified embodiment only a single basket 4 is provided; where two such baskets 4 are provided, they may be arranged one above the other. Each of the baskets 4 is furnished with an aluminium plate 5, which is either simply placed into the bottom of the basket 4 or forms its bottom. It is, however, also possible to dispense with the use of the baskets 4 and simply to insert the aluminium plate 5 into the container 1; in this case, the plate 5 advantageously rests on brackets 18 at a specific spacing from the bottom of the container 1 and from its side walls, and the metal articles that are to be deoxidised are placed directly into the container 1 so as to rest on such plate 5.

The two containers 1 and 2 are connected together by pipelines 9 and 19, of which the pipeline 9 serves as an overflow for the container 1. Incorporated into the pipeline 19 is a centrifugal pump 8 which can be put into operation for predeterminable periods of time by means of a time switch 7. After the upper container 1, empty of liquid, has been charged with the metal articles that are to be deoxidised, the time switch 7 is switched on; thereupon the pump 8 pumps deoxidising liquid out of the container 2, via the pipeline 19, into the container 1, wherein the liquid rises to a level sufficient to immerse the articles, the maximum height

thereof being determined by an overflow pipeline 9. When the time switch 7 switches off, the pump 8 stops and the deoxidising liquid can flow back through the pipeline 19 and the idle pump 8 into the reservoir 2, wherein the temperature of the deoxidising liquid, which has cooled during the deoxidising process, is brought back to the necessary level by the heating element 3. A cock 10, provided in the pipeline 19 and which is normally closed, serves to enable the apparatus to be emptied when the deoxidising liquid is to be changed or the apparatus is to be cleaned, which can be accomplished by rinsing out with a rinsing agent such as fresh water, e.g. by means of an appropriate rinsing and spraying device (not shown).

The apparatus of the invention can differ in details from the exemplified embodiments, without departing from the scope of the following claims. Thus it is possible, for example, to associate two containers for the articles to be deoxidised with one reservoir for the deoxidising liquid, and these containers can, as already mentioned above, be constructed to receive the articles without the use of a basket, or can each be equipped for the reception of one, two or more than two such baskets. Further, there can also be two or more reservoirs for the deoxidising liquid, associated with one or more containers for the articles to be deoxidised so that the liquid in the reservoirs can be in use or be heated up alternately; by this means any waiting time for the liquid to be heated can be avoided.

Irrespective of the specific embodiment selected, however, the apparatus of the invention is suitable not only for particularly rational and accident-proof deoxidising of metal articles in general, but more especially for the deoxidising of the silver or silver plated cutlery, containers, plates and so forth used in the inn and hotel trades. It is only necessary to insert the articles to be deoxidised into the container 1 and to remove them after the deoxidising has been completed, the danger of coming into contact with the deoxidising liquid and of burning oneself or of being sprayed by it is virtually precluded.

#### WHAT I CLAIM IS:—

1. Apparatus for deoxidising metal articles, comprising at least two containers which are disposed one above the other, are connected to one another and of which at least an upper one is equipped for reception of metal articles to be deoxidised, whilst at least a second one serves as a reservoir for deoxidising liquid and lies below the said upper one, means being provided for conducting the deoxidising liquid from the reservoir into the container for the metal

- articles so as to bring the liquid to a level therein sufficient to immerse the articles, and then back to the reservoir for emptying the said container for the metal articles, characterised in that the said means for conducting the deoxidising liquid comprises a centrifugal pump which operates to pump the deoxidising liquid from the reservoir to the container for the metal articles and, when stopped, permits the liquid to flow back to the reservoir.
2. Apparatus as claimed in Claim 1, wherein the container for the metal articles is provided with at least one removable basket for accommodating the metal articles.
3. Apparatus as claimed in Claim 1 or 2, characterised by the provision of an aluminium plate which is arranged in the container for the metal articles, or in the basket, or forms the bottom of the basket.
4. Apparatus as claimed in Claim 1, 2 or 3, characterised in that a time switch is provided for switching on and off the pump.
5. Apparatus as claimed in any preceding claim, wherein a heater, having a thermostat, is provided in the reservoir for the deoxidising liquid.
6. Apparatus as claimed in any preceding claim, characterised by the provision of a rinsing and spraying device for cleaning the deoxidised metal articles and the apparatus with a rinsing agent.
7. Apparatus for deoxidising metal articles substantially as hereinbefore described with reference to and as illustrated in the accompanying drawing.
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